

**UNITED STATES AGENCY FOR INTERNATIONAL
DEVELOPMENT**

Enterprise Energy Efficiency (3E) Project

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***TRAVNIK MUNICIPALITY BUILDING
PILOT PROJECT PROPOSAL No. B4-1***

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April 18, 2012

Implemented by:
Advanced Engineering Associates International, Inc. (AEAI)



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Enterprise Energy Efficiency - 3E

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TRAVNIK MUNICIPALITY BUILDING

SITE VISIT REPORT AND PILOT PROJECT PROPOSAL EVALUATION

Zoran Morvaj
Chief of Party

Sarajevo, April 18, 2012

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1. Pilot Project Proposal Screening Report

I Partners:		
Travnik Municipality		
II Proposed EE measures after USAID 3E analysis:		
1. Replacement of windows	\$57,000	
2. Insulation of façade and roof	\$82,000	
4. Monitoring and Verification System	\$15,000	
Total cost of proposed EE measures	\$154,000	
III Co-funding contributions:		
1. Direct co-funding from partner's own funds;		
Municipality of Travnik	\$44,000	
2. Partner co-financing from borrowed funds;	0	
3. Other donors' co-funding:		
UNDP	\$95,000	
4. Provision of works and services (e.g., decommissioning of old equipment, installation of new equipment, design and supervision services, monitoring and verification (M&V));	0	
5. Provision of materials and equipment (e.g., piping, wiring, insulation material, control equipment); and	0	
6. Partnership with a private sector partner that might contribute any of above.	0	
Total confirmed co-funding by partner/donors:	\$139,000	
IV Co-funding by USAID 3E:		
Total 3E Project co-funding based on best estimate:	\$15,000	
V Compliance with criteria for selection:		
1. Replicability potential and relative ease of implementation;	0 - 12	12
2. Readiness and ability to put in place clear M&V procedures for reporting on post-implementation energy savings;	0 - 12	12
3. Appropriate geographic location, building type and types of technologies so that the total portfolio of 10 pilot projects when implemented demonstrates various EE measures, technologies and practices applied to different building types or EE practices and are located across the country;	0 - 24	22
4. Amount of co-financing for the pilot project that the partner is willing to or able to secure, or the amount of assistance the pilot project can obtain from other donors or private sector;	0 - 24	22
5. For the public sector - willingness to introduce energy management practices into other public buildings that are responsibility of the partner;	0 - 12	10
6. For municipalities - readiness to sign the EU Covenant of Mayors on EE;	0 - 4	4
7. For all – a willingness to support the raising of EE awareness of building users and citizens at large.	0 - 12	12
Total:	100%	94%
VI Environmental Compliance:		
Confirm that the pilot project implementation does not cause any environmental concerns or adverse environmental effects.	Yes	

2. Project evaluation summary

2.1 Basic data about the project:

- Project is to reduce thermal losses in the building
- The year of construction = 1960
- The building is not thermally insulated
- Number of floors = 3 (including ground floor)
- Building area = 2,500 m²
- Heated area = 1,883 m²
- Top floor ceiling area = 466 m²
- Heated volume = 5,064 m³
- Outside wall area = 990 m²
- Window area = 380 m²
- Number of employees = 110
- Number of daily visitors (Approximate) = 300
- Number of operating days = 260 days per year
- The time of the building use is 8,5 hours a day, from 07.00 to 15.30
- Heating supplied by a heating substation of the district heating network
- Heat energy consumption in 2010 = 322 MWh
- Heating is charged according to consumption (calorimeter); in 2010 it was \$72,000
- Electricity consumption in 2010 = 101 MWh
- Electricity cost in 2010 = \$17,000
- Water consumption in 2010 = 1,937 m³
- Water cost in 2010 = \$5,300

2.2 Recommended measures:

1. Replacement of windows
2. Insulation of façade and roof

2.3 Rationale:

1. The Municipality windows have not been replaced since the building construction in 1960. The original windows haven't been painted regularly and are in poor condition, causing a very large heat loss.
2. A heat meter is already installed, and the energy consumption data for 2010 is available.
3. A heating substation of the city's district network is located in part of the Municipality building and supplies the building with heat. This heating substation is of adequate capacity and does not need to be replaced.
4. The heating is charged per consumption.
5. The co-funding percentage by the Municipality is approximately 30%.

2.4 Benefits:

- Demonstrate practical energy savings and improved thermal comfort through new windows and façade insulation.
- Pave the way for introducing the practice of paying for actual energy consumed in a well-insulated building, which will motivate citizens to save energy and invest in energy efficiency measures.
- Increase public awareness of benefits of energy efficiency measures to support the practice of paying for actual energy consumed.
- Motivate local governments to financially support such projects.
- Stimulate local economy – if the practice of paying for actual energy consumed is introduced, local companies will install thermal insulation, windows, repair roofs.
- Reduction of CO2 emissions.
- Public health improvement.

3. Project Technical Description and Analysis

3.1 Introduction

The Municipality of Travnik is interested in reducing energy consumption and has signed the Covenant of Mayors. In achieving the targeted reduction in overall energy consumption, reduction in the building sector plays a crucial role. A number of buildings, including schools, commercial and apartment buildings, are connected to the district heating network. A large number of the buildings have a large specific energy consumption. To motivate citizens to save energy and invest in energy efficiency measures, the practice of paying for actual energy consumed has already been introduced in the Municipality building. By improving the energy efficiency of the building envelope, this method of payment for energy use will be further promoted and showcased through this pilot project.

3.2 Site visit report

The Travnik Municipality building (Figure 1.) is a non-residential building, used by the administrative staff (110 employees), citizens who establish their rights through requests sent to officials, the Municipal Assembly, the Cantonal Assembly, as well as various NGOs for their meetings. Maintenance costs for the building are paid from the Travnik Municipality budget.



Figure 1. – Photo of the Travnik Municipality building

The Municipality building is located in the Konatur Street, in the center of town. The building has three floors. The total usable area of the municipal administration building is 2,500 m². On one part of the building, an additional floor was constructed in 2009, and the roof on this new floor was thermally insulated. The window frames in the old part of building are made of wood and are in poor condition. In the upgraded part of the building as well as the Municipality hall room, the windows were changed and new windows made of aluminum with glass filled with argon gas were installed. Insufficient building insulation led to the increased heat losses during the winter, constructive parts of the building, as well as damages caused by humidity and condensation due to poor flat roof construction, as can be seen on Figure 2.

Heating for the building is provided by the heating company “UNIS Energetika” Ltd. Sarajevo. The facility is connected to the district heating system. A heating substation is located in one part of the building, and heat is distributed throughout the building by radiators. The heat energy consumption is measured by heat meters and billed according to the consumption. The heating plant uses coal as an energy source.

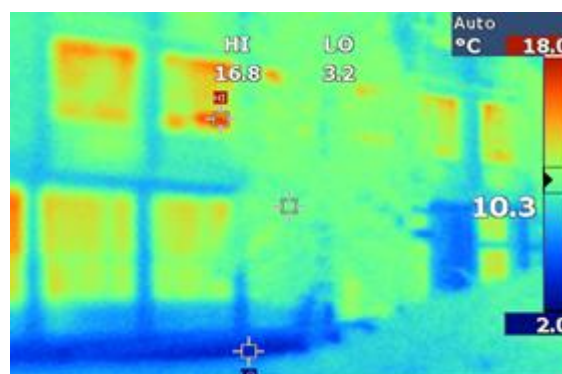


Figure 2. – Thermographic photo of administration building with clearly visible heat radiation

3.3 Technical and financial analysis

Due to heating energy waste, Travnik Municipality allocates significant funds to pay for the heating of the building premises, totaling about 76% of the budget for the energy costs of this building. Based on the construction characteristics of the Municipality building and current energy use, this building falls in the category of most consuming buildings. Given the fact that all costs in municipal buildings are in the end paid by citizens of the municipality of Travnik, this building was chosen to be a priority.

The estimated energy consumption, before and after measures, for this building are shown in the following table:

Table 1. Energy consumption

Energy carrier	Unit	Present	After measures	Savings
District heating	MWh	322	171	151

The reduction of CO2 emissions achieved by implementation of the measures is 130 tons per year.

The cost for the measures and the payback period is shown in the following table. It is assumed that the price per kWh remains the same.

Table 2. Preliminary cost and benefit analysis for recommended measures

Measures	Investment [\$]	Annual Savings Est [\$]	Simple payback period [year]
Facade, top floor, heat. substation	154,000	34,000	4.5

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